

AD-A109 898

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/6 13/13
NATIONAL DAM SAFETY PROGRAM. GLENMERE LAKE DAM, (INVENTORY NUMB--ETC(U)
SEP 81 6 KOCH DACW51-79-C-0001
NI

UNCLASSIFIED

1 + 2
2018

A
989

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM | |
|---|-----------------------|--|--|
| 1. REPORT NUMBER | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER | |
| AD-A109 898 | | | |
| 4. TITLE (and Subtitle) Phase I Inspection Report Glenmere Lake Dam Lower Hudson River Basin, Orange County, N.Y. Inventory No. 224 | | 5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program | |
| 7. AUTHOR(s) GEORGE KOCH | | 6. PERFORMING ORG. REPORT NUMBER | |
| | | 8. CONTRACT OR GRANT NUMBER(s) DACW51-79-C-0001 | |
| 10. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233 | | 13. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS | |
| 11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CoFE New York, New York 10287 | | 12. REPORT DATE 14 September 1981 | |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CoFE New York, NY 10287 | | 12. NUMBER OF PAGES | |
| | | 15. SECURITY CLASS. (of this report) UNCLASSIFIED | |
| 15. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited. | | 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE | |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) | | DTIC ELECTE JAN 22 1982 H. | |
| 18. SUPPLEMENTARY NOTES "Original contains color plates: All DTIC reproduct- ions will be in black and white" | | | |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability | | Glenmere Lake Dam Orange County Lower Hudson River Basin | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and the visual inspection of Glenmere Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action. | | | |

DD FORM 1 JAN 75 11/82 EDITION OF 1 NOV 83 IS OBSOLETE CONT

313 110

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

01 21 82 143

DTIC FILE COPY

cont Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 17% of the Probable Maximum Flood (PMF). The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity; and if a severe storm were to occur, overtopping and failure of the dam could take place significantly increasing the hazard to loss of life downstream of the dam.

It is, therefore, recommended that within 6 months of notification to the owner, detailed hydrological/hydraulic investigation of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed. The results of this investigation will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF event. In the interim, a detailed emergency action plan must be developed and implemented during unusually heavy precipitation. Around-the-clock surveillance of the structure must be provided during these periods, also remove the stoplog.

Seepage and collapsing of the downstream retaining wall warrant further investigation of the embankment. This investigation will determine the type and extent of remedial measures required.

1 LOWER HUDSON RIVER BASIN
2 GLENMERE LAKE DAM
3 ORANGE COUNTY, NEW YORK
INVENTORY NO. N.Y. 224
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST, 1981

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DTIC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



| | | | |
|---------------|-------------------------------------|--------------------------|--------------------------|
| Accession For | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| DTIC | | | |
| Available | | | |
| Dist | | | |
| Avail | | | |
| Sp | | | |
| 23 | | | |
| A | | | |

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
GLENMERE LAKE DAM
I.D. NO. NY 224
DEC NO. 179D-460
LOWER HUDSON RIVER BASIN
ORANGE COUNTY, N.Y.

TABLE OF CONTENTS

| | | <u>PAGE NO.</u> |
|-----|--------------------------------------|-----------------|
| - | ASSESSMENT | - |
| - | OVERVIEW PHOTOGRAPH | - |
| 1 | PROJECT INFORMATION | 1 |
| 1.1 | GENERAL | 1 |
| 1.2 | DESCRIPTION OF PROJECT | 1 |
| 1.3 | PERTINENT DATA | 2 |
| 2 | ENGINEERING DATA | 3 |
| 2.1 | GEOTECHNICAL DATA | 3 |
| 2.2 | DESIGN RECORDS | 3 |
| 2.3 | CONSTRUCTION RECORDS | 3 |
| 2.4 | OPERATION RECORD | 3 |
| 2.5 | EVALUATION OF DATA | 3 |
| 3 | VISUAL INSPECTION | 4 |
| 3.1 | FINDINGS | 4 |
| 3.2 | EVALUATION OF OBSERVATIONS | 5 |
| 4 | OPERATION AND MAINTENANCE PROCEDURES | 6 |
| 4.1 | PROCEDURES | 6 |
| 4.2 | MAINTENANCE OF DAM | 6 |
| 4.3 | WARNING SYSTEM IN EFFECT | 6 |
| 4.4 | EVALUATION | 6 |

| | | <u>PAGE NO.</u> |
|-----|------------------------------------|-----------------|
| 5 | HYDROLOGIC/HYDRAULIC | 7 |
| 5.1 | DRAINAGE AREA CHARACTERISTICS | 7 |
| 5.2 | ANALYSIS CRITERIA | 7 |
| 5.3 | SPILLWAY CRITERIA | 7 |
| 5.4 | RESERVE CAPACITY | 7 |
| 5.5 | FLOODS OF RECORD | 7 |
| 6.6 | OVERTOPPING POTENTIAL | 7 |
| 5.7 | EVALUATION | 7 |
| 6 | STRUCTURAL STABILITY | 8 |
| 6.1 | EVALUATION OF STRUCTURAL STABILITY | 8 |
| 7 | ASSESSMENT/RECOMMENDATIONS | 9 |
| 7.1 | ASSESSMENT | 9 |
| 7.2 | RECOMMENDED MEASURES | 10 |

APPENDICES

- A. PHOTOGRAPHS
- B. VISUAL INSPECTION
- C. HYDROLOGIC/HYDRAULIC
- D. REFERENCES
- E. DRAWINGS

Phase I Inspection Report
National Dam Safety Program

| | |
|---------------------|--|
| Name of Dam: | Glenmere Lake Dam I.D. No. NY - 224 |
| State Located: | New York |
| County Located: | Orange |
| Watershed: | Lower Hudson River Basin |
| Stream: | Browns Creek |
| Date of Inspection: | March 31, 1981 |

ASSESSMENT:

The examination of documents and the visual inspection of Glenmere Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Using the Corps of Engineers' "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 17% of the Probable Maximum Flood (PMF). The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity; and if a severe storm were to occur, overtopping and failure of the dam could take place significantly increasing the hazard to loss of life downstream of the dam.

It is, therefore, recommended that within 6 months of notification to the owner, detailed hydrological/hydraulic investigation of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed. The results of this investigation will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF event. In the interim, a detailed emergency action plan must be developed and implemented during unusually heavy precipitation. Around-the-clock surveillance of the structure must be provided during these periods, also remove the stoplog.

Seepage and collapsing of the downstream retaining wall warrant further investigation of the embankment. This investigation will determine the type and extent of remedial measures required.

In addition, the dam has a number of problem areas which if left uncorrected have the potential for the development of hazardous conditions and must be corrected within 1 year. These areas are:

1. Collapsing portions of the retaining wall on the downstream slope of the embankment.
2. Seepage at several points on the downstream toe of the embankment.
3. Deteriorated concrete elements and joints of the spillway structure, wingwalls should be repaired and backfilled.
4. Heavy vegetation and debris in and around the spillway channel.
5. Remove the stoplog in the spillway to reduce normal pool elevation. Rip rap the upstream slope.
6. Provide a program of periodic inspection and maintenance of the dam and appurtenance. Document this information for future reference.
7. Develop the above-mentioned emergency action plan.

Donna Koch
G. Koch

Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved by:

W.M. Smith, Jr.
Col. W.M. Smith, Jr.
New York District Engineer

Date:

14 Sep 81



Overview - Glenmere Lake Dam

Phase I Inspection Report
National Dam Safety Program
Glenmere Lake Dam I.D. No. NY 224
DEC #179D-460 Lower Hudson River Basin
Orange County

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Glenmere Lake Dam is a 600 feet long earth embankment with a concrete drop inlet type spillway located at the right end of the embankment. It is 24 feet high at its maximum height. The upstream slope of the embankment is rip rapped below the present water surface at a $1\frac{1}{2}$ horizontal to 1 vertical. The nearly vertical downstream slope is a 5 feet thick dry stone wall. This stone wall has been replaced in one 63 feet section by a concrete wall where it had previously collapsed. The embankment also serves a town road, maintained by the Town of Chester. The spillway has a weir length of 12.4 feet by which flow passes over and into a 6.5 by 6.0 feet rectangular culvert through the embankment. There is no operational reservoir drain. The downstream channel consists of an open section of channel leading to a horseshoe culvert under another downstream embankment believed to be associated with the previous mill operation.

b. Location

The dam is located on Browns Creek, a tributary of the Wallkill River and Hudson River, approximately one mile east of the Village of Florida, New York.

c. Size

The dam is 24 feet high and impounds 2830. acre feet at normal pool elevation with flashboards. The dam is classified as "intermediate" in size.

d. Hazard Classification

The dam is classified as high hazard due to its location above several low lying homes in the area between the dam and the Village of Florida, New York. The Village of Florida is within one mile of the Glenmere Lake Dam.

e. Ownership

The dam is owned by Florida Water Works Company, which is owned and operated by Mr. Raymond Green, Florida, New York (914)651-4164.

f. Purpose of Dam

Originally the dam was built to power a mill, however, since 1892 the storage provided has been used for water supply.

g. Design and Construction History

There is no information available with regard to design or construction. From information located in the NYSDEC files, it can be ascertained that the dam is about 100 years old.

h. Normal Operating Conditions

All flows in excess of the Florida Water Works requirements are passed over the uncontrolled spillway. A reservoir drain could not be located.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.) 2.40

b. Elevations (ft. USGS Datum)

| | |
|-------------------------|--------|
| Top of Dam | 534.0 |
| Top of Stop Logs | 532.55 |
| Spillway Crest | 532.0 |
| Original Stream Channel | 510.0± |

c. Reservoir

| | |
|---------------------------------------|--------|
| Surface Area @ Spillway Crest (acres) | 328.0 |
| Storage @ Top of Dam (acre feet) | 3327.0 |
| Storage @ Spillway Crest (acre feet) | 2832.0 |

d. Dam

Type: Earth fill with rip rapped upstream slope and stone retaining wall downstream slope.

| | |
|--------------------|-------------|
| Length (ft.) | 600.0 |
| Height (max.; ft.) | 24.0 |
| Upstream Slope | 1½H:1V |
| Downstream Slope | about 1H:5V |
| Crest Width (ft.) | 23.0± |

e. Spillway

Type: Drop inlet to 6.5 X 6.0 rectangular culvert through embankment.

| | |
|--------------------------------------|------|
| Weir Length (ft.) | 12.4 |
| Spillway Capacity @ Top of Dam (cfs) | 78.0 |
| Reservoir Drain | None |

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

The Glenmere Lake Dam is located in the "Hudson Valley Lowlands" physiographic province of New York State. These lowland areas have gentle relief and are underlain by Ordovician shales that have been exposed by the erosion of overlying Silurian and Devonian limestones. Drainage is generally northeast towards the Hudson River.

b. Subsurface Investigation

The Troy-Cossayuna is the dominant association of the glacial till of the Hudson Valley (Ref. 8). No information could be found concerning site conditions during construction.

2.2 DESIGN RECORDS

The dam was constructed around one hundred years ago and consisted of an earth embankment protected with stone. The dam was originally used for power and intakes existed to the left of the present spillway. These intakes were blocked off at some time before 1926 when the Florida Water Works gained water rights to the lake. There are no plans or construction data available.

2.3 CONSTRUCTION RECORDS

There are no construction records available for Glenmere Lake Dam.

2.4 OPERATION RECORD

There are no operating records available.

2.5 EVALUATION OF DATA

The data presented in this report is compiled from information contained in the files of the Department of Environmental Conservation and from data gained from the visual inspection. This information appears to be adequate and reliable for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Glenmere Lake Dam and surrounding watershed was conducted on March 31, 1981. The weather was partially cloudy and the temperature ranged in the fifties. The reservoir water surface was at the top of the stoplogs. There was a higher draw of water than normal due to the emergency diversion of water to the Village of Goshen (Photo #2).

b. Dam

The earth embankment shows signs of distress which require further investigation to determine the severity of the problem areas. The upstream slope was found to be very irregular with some areas of movement as evidenced by the guard rails and shoreline (Photo #1). The dam has a town road running along its crest, and the shoulders of the road are showing signs of erosion and general wear from vehicular traffic (Photo #2). From the left abutment (Photo #7), there is local drainage running along the toe of the embankment; the pipeline to Goshen is leaking at the chlorination house. The downstream slope is caving in almost the entire length of the dam (Photos #9, 10, and 11). Seepage is emanating at several points along the downstream slope creating the sloughing and movement of the wall (Photo #8).

c. Seepage

Seepage was observed emanating from several points. The two major point seepages are located approximately 150 feet from the chlorination house and adjacent to the concrete retaining wall. The seepage totalled about 5 gallons per minute. This combined with the pipeline leakage to form the flow along the toe of the embankment. The flow did not appear to be carrying fines; however, the failure of the stone retaining walls warrants investigation into the seepage.

d. Spillway

The concrete drop inlet spillway is in fair condition. The concrete box culvert is in need of repair, joints should be cleaned and recaulked, cracks patched, and wingwalls repaired and back-filled. (Photos #4 and 5). The downstream channel is full of debris, which could block the horseshoe culvert diverting flow along the toe of the embankment (Photo #6).

e. Reservoir Drain

Besides the water supply draw off the only visible drain was an 8 inch pipe through the spillway wall, however, no control could be located.

f. Downstream Channel

The downstream channel is confined to a horseshoe culvert just downstream of the culvert through the embankment (Photo #6). There is heavy vegetation and debris in and around the channel. Upon exiting the horseshoe culvert, the channel takes a natural course which is well defined with steep side slopes.

g. Reservoir

There are no visible signs of instability around the reservoir. The lake formed by the dam is rather shallow as are the banks surrounding it.

3.2 EVALUATION

Significant conditions were observed which require investigation to determine what remedial action is required to insure the stability of the dam and appurtenances. The following is a summary of the problem areas encountered with appropriate recommended action:

1. The movement of guard rails and collapsing of portions of the wall indicate that movement of both upstream and downstream slopes has occurred. These areas should be monitored at bi-weekly intervals to ascertain if any ongoing movement is occurring. These areas must be repaired or replaced.
2. Seepage which was observed at several points along the toe of the embankment should be monitored at bi-weekly intervals with the aid of weirs. If the flow rate increases significantly or the migration of fines occurs, immediate remedial measures will be required to control this seepage.
3. The concrete elements of the spillway are cracked, and the joints are deteriorated. Repair all deteriorated areas during low flow periods and recaulk joints. The wingwalls should be repaired and backfilled.
4. Considerable vegetation was observed growing on the downstream slope around the spillway channel which is filled with vegetation and debris. Both vegetation and debris should be removed.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURE

4.1 PROCEDURES

The normal water surface elevation is approximated by the top of the slopes on the uncontrolled overflow spillway. The only other draw off from the reservoir is to the Florida Water Works Company.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the Florida Water Works Company; the roadway is maintained by the Town of Chester. Maintenance of the dam is not considered satisfactory as evidenced by the erosion of the upstream slope and crest, collapse of much of the retaining wall and overall deterioration of the spillway structures.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenances have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection."

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Glenmere Lake Dam is located on Browns Creek, about one mile east of the Village of Florida, Orange County, New York. The total drainage area is 2.40 square miles. The basin was broken into two sub-basins; one is 0.51 square miles, which is the surface area of the lake itself, and the other is 1.89 square miles which has rather mild slopes interspersed by scattered ponds.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer program incorporating the "Snyder Synthetic Unit Hydrograph" method and the "Modified Puls" flood routing procedure. The floods selected for analysis were the PMF and 1/2 the PMF in accordance with the recommended guidelines of the Corps of Engineers.

5.3 SPILLWAY CAPACITY

The spillway has a capacity of 78 cfs. For 1/2 the PMF, the peak inflow will be 2406 cfs and the peak outflow will be 1182 cfs. During this event, the dam will be overtopped by 0.65 foot of water. For the PMF, the peak inflow will be 4812 cfs and the peak outflow will be 3029 cfs. During this event, the dam will be overtopped by 1.29 feet of water.

5.4 RESERVOIR CAPACITY

Capacity to normal water elevation is 2830 acre feet. Surcharge storage to top of dam is an additional 542 acre feet creating a total storage of 3372 acre feet. The surcharge storage between spillway and dam crests is equivalent to 4.23 inches of runoff.

5.5 FLOODS OF RECORD

No records of past floods for Browns Creek are available.

5.6 OVERTOPPING POTENTIAL

The analysis indicates the embankment will be overtopped during all storms in excess of 17% of the PMF. A storm equal to 1/2 the PMF will cause overtopping of the embankment by about 0.65 foot of water, whereas, the PMF is expected to cause overtopping by 1.29 feet.

5.7 EVALUATION

The spillway is inadequate to pass the floods exceeding 17% of the PMF. The spillway, therefore, is adjudged as "seriously inadequate", and the dam is assessed as unsafe, non-emergency.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observation

Signs of distress, significant enough to warrant further investigation, were found along the retaining wall, downstream slope of the embankment. Collapsing of the stone wall, movement of the guard rails, and seepage emanating from several points along the toe warrant this investigation.

b. Design and Construction Data

No information could be located regarding the structural stability of the structure.

c. Operation Records

No operating problems which would affect the stability of the dam were found. However, removal of the 0.55 foot stoplog would reduce the possibility of overtopping by wave run up somewhat.

d. Post Construction Changes

Since the original construction, which was for power to an adjacent mill, some changes have occurred. Information taken from the NYS Department of Environmental Conservation files shows that these changes were the present spillway and the blocking off of intakes to the mill.

e. Seismic Stability

Glenmere Lake Dam is located in Seismic Zone 1, therefore, no seismic analysis was performed.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of Glenmere Lake Dam revealed that the spillway is "seriously inadequate," based upon the Corps of Engineers screening criteria; the outflows from any storm in excess of 17% of the PMF will overtop the dam. This overtopping could cause breaching of the dam, and the resulting flood wave would significantly increase the hazard to downstream residents. For these reasons, the dam has been assessed as unsafe, non-emergency.

In addition, the dam has a number of problem areas which if left uncorrected, have the potential for the development of hazardous conditions. These areas are:

1. Collapsing portions of the retaining wall on the downstream slope of the embankment.
2. Seepage at several points on the downstream toe of the embankment.
3. Deteriorated concrete elements and joints of the spillway structure. Wingwalls should be repaired and backfilled.
4. Vegetation and debris in and around the spillway channel.

b. Adequacy of Information

The information reviewed is considered adequate for Phase I Inspection purposes.

c. Need for Additional Investigations

Since the spillway is considered to be "seriously inadequate," additional hydrologic/hydraulic investigation is required to more accurately determine the site specific characteristics of the watershed. After the in-depth hydrologic/hydraulic investigation has been completed, remedial measures must be initiated to provide spillway capacity sufficient to discharge the outflow from the 1/2 PMF event. In addition, the seepage and deterioration of the embankment require further investigation of the embankment. This investigation will determine the type and extent of remedial measures required.

d. Urgency

The additional hydrologic/hydraulic investigation must be initiated within 6 months from the date of notification. Within 1 year of notification, remedial measures, as a result of these investigations, must be initiated with completion of the measures during the following year. In the interim, develop an emergency action plan for the notification of downstream residents and proper governmental authorities in the event of overtopping and provide round-the-clock surveillance of the dam during periods of extreme run off. The investigation of the embankment must be initiated within 6 months and remedial measures required, completed within 1 year. The other problem areas listed below must be corrected within 1 year from notification.

7.2 RECOMMENDED MEASURES

1. The results of the hydrologic/hydraulic investigation will determine the appropriate remedial actions for the spillway.
2. The results of the embankment investigation will determine the appropriate remedial work.
3. Monitor the downstream retaining wall at bi-weekly intervals to ascertain if a significant movement is occurring.
4. Monitor the seepage at the toe of the downstream slope at bi-weekly intervals with the aid of weirs. If flow rates increase significantly or migration of fines occurs, immediate remedial measures will be required to control this seepage.
5. Remove the stoplog in the spillway to reduce effect of wave action on the upstream slope. Rip rap the upstream slope for protection.
6. Repair all deteriorated concrete surfaces and clean and recaulk joints in spillway structure. Repair wingwalls and backfill.
7. Remove heavy vegetation and debris from downstream slope and spillway channel.
8. Provide a program of periodic inspection and maintenance of the dam and appurtenances. Document this information for future reference.
9. An emergency action plan must be developed and maintained during the life of the structure.

APPENDIX A

PHOTOGRAPHS



Photo #1 Upstream slope - Note irregularity and guard rail movement.



Photo #2 Crest of embankment. Pipeline to Goshen on right.

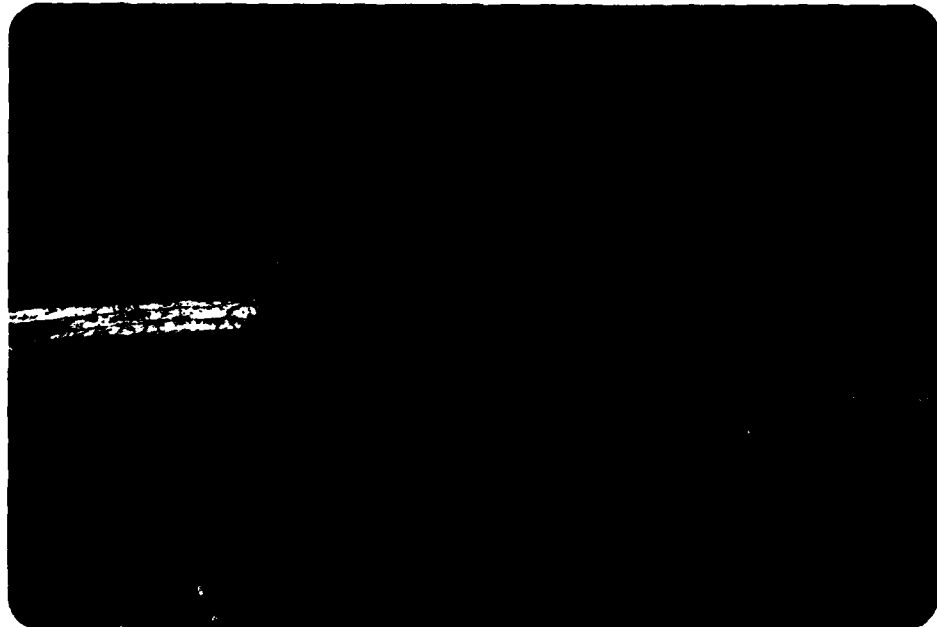


Photo #3 Deterioration of crest, right of spillway



Photo #4 Spillway crest. Note deterioration of concrete and construction joints.



Photo #5 Spillway culvert. Note deterioration of wingwalls and concrete.



Photo #6 Spillway channel. Note debris.



Photo #7 Embankment from left abutment



Photo #8 Seepage at toe of retaining wall.



Photo #9 Downstream slope. Note movement of guard rails and wall.



Photo #10. Collapse of retaining wall.



Photo #11. Collapse of wall and embankment.

APPENDIX 8

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST1) Basic Data

a. General

Name of Dam GLENMERE LAKE DAM
Fed. I.D. # NY 224 DEC Dam No. 179D-460
River Basin LOWER HUDSON
Location: Town CHESTER County ORANGE
Stream Name BROWN'S CREEK
Tributary of WALKILL RIVER
Latitude (N) 41°20.4' Longitude (W) 74°21.9'
Type of Dam EARTH embankment / MASONRY downstream slope
Hazard Category high - "C"
Date(s) of Inspection MARCH 31, 1981
Weather Conditions cloudy - 50's.
Reservoir Level at Time of Inspection top of stop log

b. Inspection Personnel Robert Durrin, JAMIE VEITCH

c. Persons Contacted (Including Address & Phone No.)

John C. HARTER, Mayor & DAN KIMIECIK, TRUSTEE
Village of Florida, INC.
FLORIDA NY
(914) 651-7815

d. History:

Date Constructed c. 1880 Date(s) Reconstructed 1926
Designer UNKNOWN
Constructed By UNKNOWN
Owner FLORIDA WATER WORKS ; Mr. Ray Green

2) Embankment

a. Characteristics

- (1) Embankment Material earth, stone wall (downstream slope)
- (2) Cutoff Type UNKNOWN
- (3) Impervious Core UNKNOWN
- (4) Internal Drainage System ONLY IN CONCRETE SECTION OR
RETAINING WALL
- (5) Miscellaneous _____

b. Crest

- (1) Vertical Alignment FAIR
- (2) Horizontal Alignment GOOD
- (3) Surface Cracks NONE
- (4) Miscellaneous CREST ROUNDED, WAVE EROSION ON UPSTREAM
SLOPE, RUNOFF, VEHICULAR WEAR CRACKING DOWNSTREAM
EDGE OF CREST.

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1: 1 1/2
- (2) Undesirable Growth or Debris, Animal Burrows NONE
- (3) Sloughing, Subsidence or Depressions EROSION CAUSED BY
WAVE ACTION

(4) Slope Protection rip rap & some concrete - broken
up

(5) Surface Cracks or Movement at Toe

d. Downstream Slope

(1) Slope (Estimate - V:H) nearly vertical

(2) Undesirable Growth or Debris, Animal Burrows heavy brush
and tree

(3) Sloughing, Subsidence or Depressions wall collapsing in
several spots along dam

(4) Surface Cracks or Movement at Toe sloughing & collapsing
along d/s toe

(5) Seepage several points of seepage

(6) External Drainage System (Ditches, Trenches; Blanket)
trench along toe for local drainage - block
w/ leaves, silt, debris

(7) Condition Around Outlet Structure filled with debris

(8) Seepage Beyond Toe NO

e. Abutments - Embankment Contact

seepage, debris, sloughing

(1) Erosion at Contact No

(2) Seepage Along Contact yes

3) Drainage System

a. Description of System only from concrete portion of retaining wall

b. Condition of System —

c. Discharge from Drainage System dripping

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

None

5) Reservoir

- a. Slopes shallow
- b. Sedimentation no apparent problem
- c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) roadway across crest of DAM, several home d/s at another rd. crossing
- b. Seepage, Unusual Growth —
- c. Evidence of Movement Beyond Toe of Dam —
- d. Condition of Downstream Channel heavily treed, debris-

7) Spillway(s) (Including Discharge Conveyance Channel)

- a. General drop inlet, 1-6" stoplog
- b. Condition of Service Spillway concrete joints deteriorated, spalling

c. Condition of Auxiliary Spillway _____

d. Condition of Discharge Conveyance Channel filled with debris -
channel walls collapsing, downstream wingwall
deteriorated, erosion along wing walls

8) Reservoir Drain/Outlet NA

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): _____ Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

9) Structural

- a. Concrete Surfaces _____

- b. Structural Cracking _____

- c. Movement - Horizontal & Vertical Alignment (Settlement) d/s
retaining wall collapsing entire length

- d. Junctions with Abutments or Embankments fair

- e. Drains - Foundation, Joint, Face _____

- f. Water Passages, Conduits, Sluices _____

- g. Seepage or Leakage seepage at several points at
d/s toe from retaining wall (causing sloughing)

- h. Joints - Construction, etc. Joints in drop inlet and tunnel deteriorated
- i. Foundation APPARENTLY O.K.
- j. Abutments GOOD
- k. Control Gates NONE
- l. Approach & Outlet Channels APPROACH OKAY - OUTLET FULL OF DEBRIS
- m. Energy Dissipators (Plunge Pool, etc.)
- n. Intake Structures NONE
- o. Stability APPARENTLY GOOD, EXCEPT FOR RETAINING WALL WHICH
- p. Miscellaneous

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)a. Description and Condition SMALL PUMP HOUSE AND

Chlorination building fair condition -
at time of inspection there was a diversion
pipeline to the village of Goshen

11) Operation Procedures (Lake Level Regulation):

one stoplog in place @ time of inspection -
possible to add more.

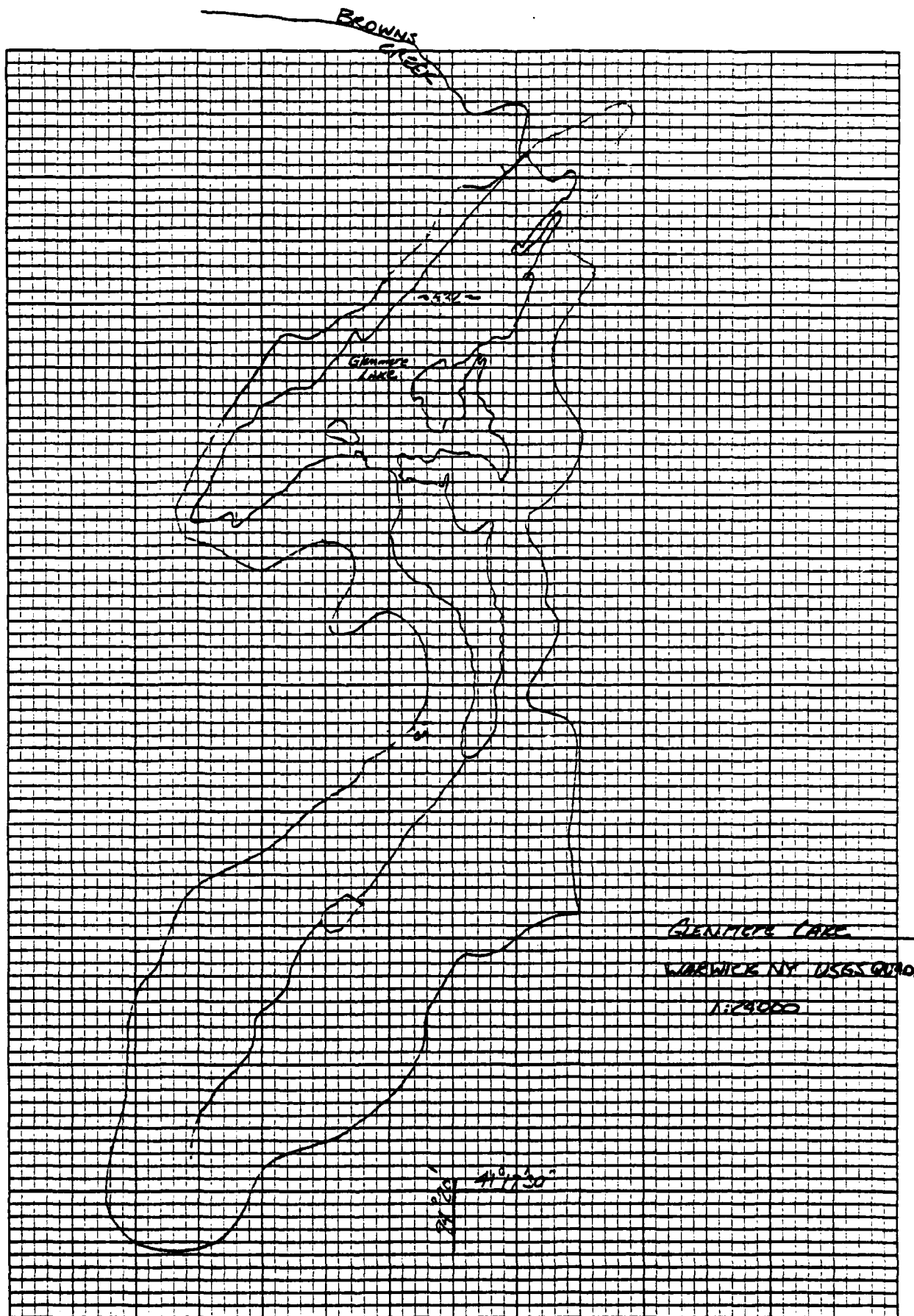
APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

46 0782

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



GLENMERE LAKE

DRAINAGE AREA : $16.76 \frac{(24000)^2}{144(43560)} = 1539.0 \text{ ACRES}$
From USGS quad. $= 2.40 \text{ mi.}^2$

POND AREA: $3.57 (") = 327.8 \text{ ACRES @ } 532$
 $= 0.51 \text{ mi.}^2$

$4.56 (") = 418.7 \text{ ACRES @ } 540$

$5.96 (") = 547.2 \text{ ACRES @ } 560$

| EL. | AREA | AREA | Vol. | Σ Vol |
|-----|------|------------------------------|------|--------------|
| 508 | 0 | 0 | 0 | 0 |
| | | $\frac{1}{3}Ah = \text{Vol}$ | | |
| 532 | 323 | | | 2624 |
| 540 | 419 | 379 | 2992 | 5616 |
| 560 | 547 | 483 | 9660 | 15276 |

Height. approximately 24 feet high at its highest
fill location.

Glenmere Lake

SPILLWAY CAPACITY 539.0 \leftarrow TOP OF DAM \rightarrow

ELEVATION 532.0

WEIR LENGTH = 12.4'

ASSUME FLASHBOARDS REMAINS INTACT

ASSUME $C = 3.6$ sharp crested

| EL | H | C | Q |
|--------|------|-----|-------|
| 532.55 | 0 | 3.6 | 0.0 |
| 533.0 | 0.45 | 3.6 | 13.5 |
| 533.55 | 1.0 | 3.6 | 44.6 |
| 534.0 | 1.45 | 3.6 | 77.9 |
| 534.55 | 2.0 | 3.6 | 126.3 |
| 535.0 | 2.45 | 3.6 | 171.2 |

STEEP SLOPE
($>$ CRITICAL)

PRECIPITATION

$\Sigma PMP = 21.5"$

| DUR. | 6 | 12 | 24 | 48 |
|------|-----|-----|-----|-----|
| % | 111 | 123 | 133 | 142 |

DRAINAGE AREA = 2.40 Mi^2

$$L = 9.9 \left(\frac{21.5}{12(5280)} \right) = 3.75 \text{ mi} \quad C_t = 2.0$$

$$L_{ca} = 5.9(\times) = 2.05 \text{ mi} \quad C_p = .625$$

$$t_p = C_t (L \times L_{ca})^{0.3} = 2. (3.75 \times 2.05)^{0.3} = 3.69 \text{ hr.}$$

$$t_r = \frac{t_p}{5.5} = .67 \text{ hr} = 40 \text{ MIN.} \quad \text{USE } 30 \text{ MIN.}$$

$$T_p = t_p + 0.25(t_r - t_p) = 3.69 + .25(.67 - .67) = 3.65 \text{ hr.}$$

Glenmere LAKE

TRANSPOSITION FACTOR

$$TF = 1 - \frac{0.3008}{(DA)^{0.17718}} = 1 - \frac{0.3008}{(2.4)^{0.17718}} = 0.742$$

ANALYZE FOR TWO BASINS

POND AREA - DIRECT INPUT NO LOSS

UPPER AREA - LAGGED W/ LOSS OF 1" INITIAL
0.1"/hr

UPPER AREA

$t_r = 30 \text{ MIN.}$

SNYDER U.H. $T_p = 3.65$

$C_p = 0.625$

D.A. = 1.89 mi.²

POND AREA

$t_r = 30 \text{ MIN.}$

INPUT U.H. = $\frac{A(1")}{30 \text{ MIN.}} = \frac{(51)(640/43560)(1") \frac{1 \text{ hr}}{12}}{(30 \text{ MIN.}) 60 \frac{\text{s}}{\text{min.}}}$
= 658, cfs

D.A. = 0.51 mi.²

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

1

AREA-CAPACITY DATA:

| | <u>Elevation</u> (ft.) | <u>Surface Area</u> (acres) | <u>Storage Capacity</u> (acre-ft.) |
|--|---------------------------|--------------------------------|---------------------------------------|
| 1) Top of Dam | <u>534.0</u> | <u>351</u> | <u>3372</u> |
| 2) Design High Water (Max. Design Pool) | <u>-</u> | <u>-</u> | <u>-</u> |
| 3) Auxiliary Spillway Crest | <u>-</u> | <u>-</u> | <u>-</u> |
| 4) Pool Level with Flashboards | <u>532.55</u> | <u>334</u> | <u>2830</u> |
| 5) Service Spillway Crest | <u>532.55</u> | <u>334</u> | <u>2830</u> |

DISCHARGES

| | <u>Volume</u> (cfs) |
|---|------------------------|
| 1) Average Daily | <u>-</u> |
| 2) Spillway @ Maximum High Water | <u>78</u> |
| 3) Spillway @ Design High Water | <u>NA</u> |
| 4) Spillway @ Auxiliary Spillway Crest Elevation | <u>-</u> |
| 5) Low Level Outlet | <u>-</u> |
| 6) Total (of all facilities) @ Maximum High Water | <u>78</u> |
| 7) Maximum Known Flood | <u>NA</u> |
| 8) At Time of Inspection | <u>None</u> |

CREST:

ELEVATION: _____

Type: Compacted earth. upstream face of dry stone wallWidth: 5' Length: 600'

Spillover _____

Location _____

SPILLWAY:

SERVICE

AUXILIARY

532.55' Elevation _____Drop Inlet Type _____12.4' Width _____

Type of Control

✓ Uncontrolled _____

Controlled:

Flashboards Type _____
(Flashboards; gate)

Number _____

0.55' high Size/Length _____

Invert Material _____

Anticipated Length
of operating service _____

Chute Length _____

Height Between Spillway Crest
& Approach Channel Invert
(Weir Flow) _____

HYDROMETEROLOGICAL GAGES:

Type : None

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

None

DRAINAGE AREA: 2.40 mi.²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Woods, open field, Some residential development.

Terrain - Relief: Upper area - mild slope. Lower area - Pond

Surface - Soil: Silurian and Devonian limestones

Runoff Potential (existing or planned extensive alterations to existing
(surface or subsurface conditions)

No alterations planned or anticipated

Potential Sedimentation problem areas (natural or man-made; present or future)

None evident

Potential Backwater problem areas for levels at maximum storage capacity
including surcharge storage:

Several low lying homes downstream
of the dam

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the
Reservoir perimeter:

Location: None

Elevation: _____

Reservoir:

Length @ Maximum Pool _____ (Miles)

Length of Shoreline (@ Spillway Crest) _____ (Miles)

.....
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 26 FEB 79
 MODIFIED FOR HONEYWELL APR 79

.....
 NEW YORK STATE
 DEPT OF ENVIRONMENTAL CONSERVATION
 FLOOD PROTECTION BUREAU

1 A1 CLEMENS LAKE DAM
 2 A2 PHASE I INSPECTION
 3 A3 PAY 1981

4 M 200 0 30 0 0 0 0 0 0
 5 B1 5

6 J 1 6 1

7 J1 .2 .4 .5 .6 .3 1.

8 K 1 1 2 2 1

9 K1 INFLOW FROM UPPER BASIN AREA

10 M 1 1 1.89 2.43 0.742

11 P 21.5 111 123 133 142

12 Y 1.0 0.1

13 Z 3.65 0.625

14 X -2 -.1 1

15 K 1 1 2 1

16 K1 DIRECT INFLOW TO RESERVOIR FROM RAINFALL

17 M 1 -1 0.51

18 P 21.5 111 123 133 142

19 1

20 U 1

21 U1 658

22 X -2 -.1 1

23 K 2 1 2 1

24 K1 COMBINE INFLOWS

25 K 1 1 2 2 1

26 K1 ROUTE THROUGH RESERVOIR

27 Y 1 1 1

28 Y1 1 -532.55 -1

29 Y4532.55 533 532.55 534 534.55 535

30 Y5 14 45 78 126 171

| | | | | |
|----|----------|------|------|-------|
| 1 | 25 | 2024 | 1610 | 10270 |
| 2 | 50 | 000 | 032 | 540 |
| 3 | 01510.50 | | | 50.0 |
| 4 | 50 | 000 | 032 | 100 |
| 5 | 1 | 94 | | |
| 6 | 4 | | | |
| 7 | 2 | | | |
| 8 | 4 | | | |
| 9 | 4 | | | |
| 10 | 4 | | | |

11/2/83

FOR USE OF SUBJECT OF SYDEAN NETWORK CALCULATIONS

HICOF HYDROGRAPH AT 1
 HICOF HYDROGRAPH AT 1
 CONSOLE 2 HYDROGRAPHS AT 1
 FOUR IN TOTAL TO 1
 FOR OF F. L. 1

.....

NOV 19 1963

11-15-1957 10:00 AM
11-15-1957 10:00 AM
11-15-1957 10:00 AM

ACTIVITIES SECTION

[illegible]

SECRET

1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755

[illegible]

三、

[illegible]

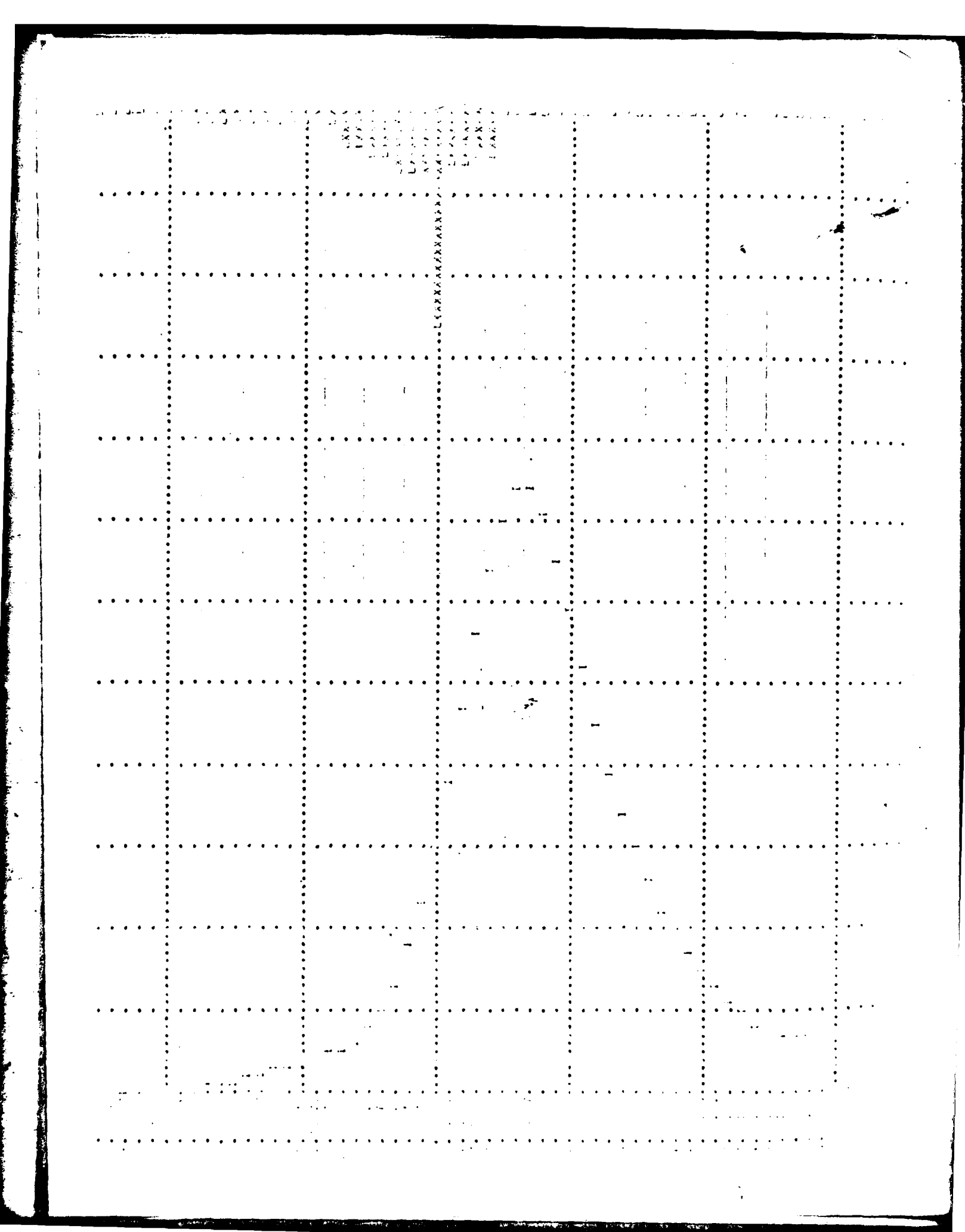
UNIT - PROGRAM DATA

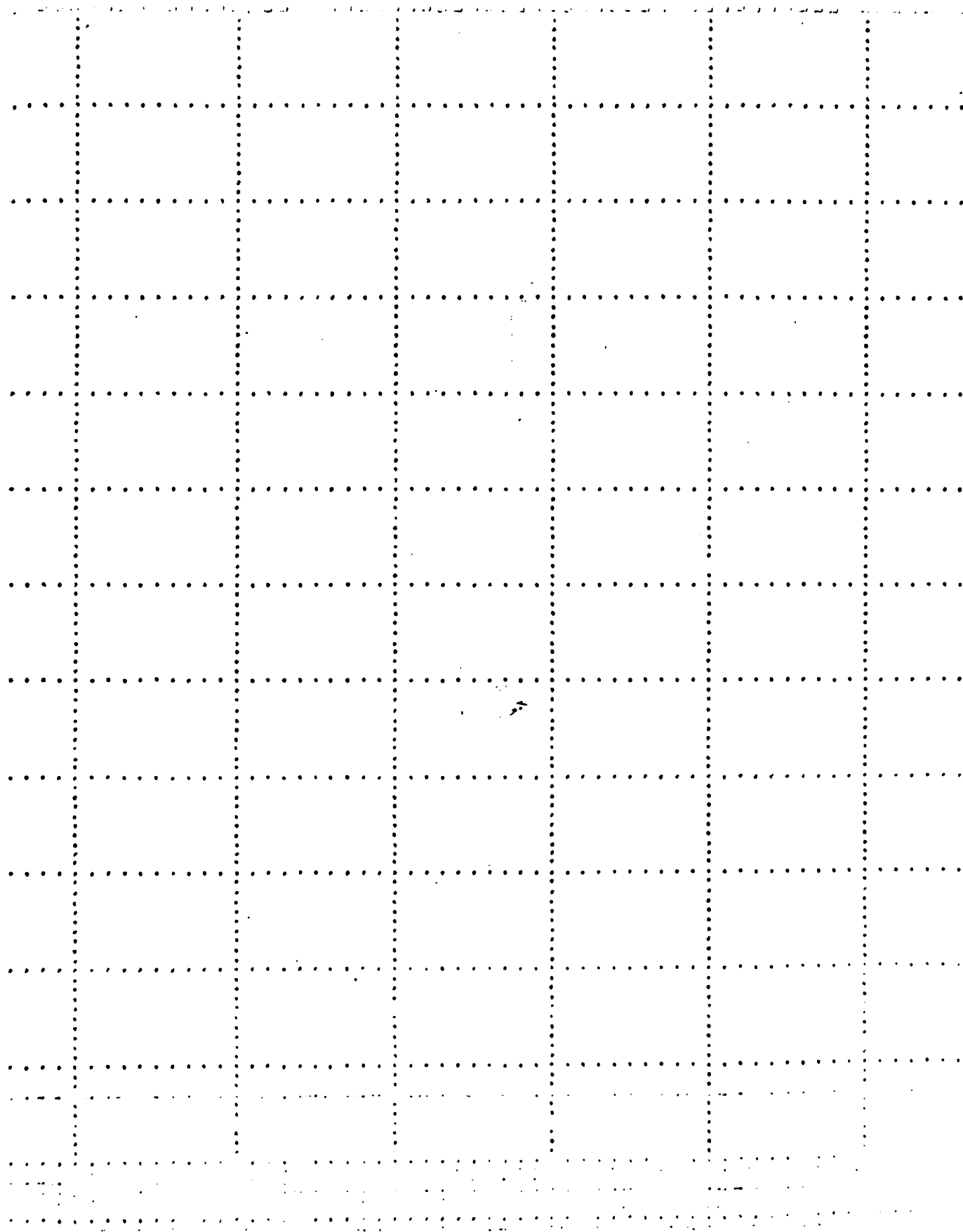
$$14 = 3.0 \quad CP = 2.55 \quad \therefore TA = 0$$

2000

[illegible][illegible]

[illegible]





| | | | |
|------|------|------|------|
| 1876 | 1877 | 1878 | 1879 |
| 1880 | 1881 | 1882 | 1883 |
| 1884 | 1885 | 1886 | 1887 |
| 1888 | 1889 | 1890 | 1891 |
| 1892 | 1893 | 1894 | 1895 |
| 1896 | 1897 | 1898 | 1899 |
| 1900 | 1901 | 1902 | 1903 |
| 1904 | 1905 | 1906 | 1907 |
| 1908 | 1909 | 1910 | 1911 |
| 1912 | 1913 | 1914 | 1915 |
| 1916 | 1917 | 1918 | 1919 |
| 1920 | 1921 | 1922 | 1923 |
| 1924 | 1925 | 1926 | 1927 |
| 1928 | 1929 | 1930 | 1931 |
| 1932 | 1933 | 1934 | 1935 |
| 1936 | 1937 | 1938 | 1939 |
| 1940 | 1941 | 1942 | 1943 |
| 1944 | 1945 | 1946 | 1947 |
| 1948 | 1949 | 1950 | 1951 |
| 1952 | 1953 | 1954 | 1955 |
| 1956 | 1957 | 1958 | 1959 |
| 1960 | 1961 | 1962 | 1963 |
| 1964 | 1965 | 1966 | 1967 |
| 1968 | 1969 | 1970 | 1971 |
| 1972 | 1973 | 1974 | 1975 |
| 1976 | 1977 | 1978 | 1979 |
| 1980 | 1981 | 1982 | 1983 |
| 1984 | 1985 | 1986 | 1987 |
| 1988 | 1989 | 1990 | 1991 |
| 1992 | 1993 | 1994 | 1995 |
| 1996 | 1997 | 1998 | 1999 |
| 2000 | 2001 | 2002 | 2003 |
| 2004 | 2005 | 2006 | 2007 |
| 2008 | 2009 | 2010 | 2011 |
| 2012 | 2013 | 2014 | 2015 |
| 2016 | 2017 | 2018 | 2019 |
| 2020 | 2021 | 2022 | 2023 |
| 2024 | 2025 | 2026 | 2027 |
| 2028 | 2029 | 2030 | 2031 |
| 2032 | 2033 | 2034 | 2035 |
| 2036 | 2037 | 2038 | 2039 |
| 2040 | 2041 | 2042 | 2043 |
| 2044 | 2045 | 2046 | 2047 |
| 2048 | 2049 | 2050 | 2051 |
| 2052 | 2053 | 2054 | 2055 |
| 2056 | 2057 | 2058 | 2059 |
| 2060 | 2061 | 2062 | 2063 |
| 2064 | 2065 | 2066 | 2067 |
| 2068 | 2069 | 2070 | 2071 |
| 2072 | 2073 | 2074 | 2075 |
| 2076 | 2077 | 2078 | 2079 |
| 2080 | 2081 | 2082 | 2083 |
| 2084 | 2085 | 2086 | 2087 |
| 2088 | 2089 | 2090 | 2091 |
| 2092 | 2093 | 2094 | 2095 |
| 2096 | 2097 | 2098 | 2099 |
| 2100 | 2101 | 2102 | 2103 |
| 2104 | 2105 | 2106 | 2107 |
| 2108 | 2109 | 2110 | 2111 |
| 2112 | 2113 | 2114 | 2115 |
| 2116 | 2117 | 2118 | 2119 |
| 2120 | 2121 | 2122 | 2123 |
| 2124 | 2125 | 2126 | 2127 |
| 2128 | 2129 | 2130 | 2131 |
| 2132 | 2133 | 2134 | 2135 |
| 2136 | 2137 | 2138 | 2139 |
| 2140 | 2141 | 2142 | 2143 |
| 2144 | 2145 | 2146 | 2147 |
| 2148 | 2149 | 2150 | 2151 |
| 2152 | 2153 | 2154 | 2155 |
| 2156 | 2157 | 2158 | 2159 |
| 2160 | 2161 | 2162 | 2163 |
| 2164 | 2165 | 2166 | 2167 |
| 2168 | 2169 | 2170 | 2171 |
| 2172 | 2173 | 2174 | 2175 |
| 2176 | 2177 | 2178 | 2179 |
| 2180 | 2181 | 2182 | 2183 |
| 2184 | 2185 | 2186 | 2187 |
| 2188 | 2189 | 2190 | 2191 |
| 2192 | 2193 | 2194 | 2195 |
| 2196 | 2197 | 2198 | 2199 |
| 2200 | 2201 | 2202 | 2203 |
| 2204 | 2205 | 2206 | 2207 |
| 2208 | 2209 | 2210 | 2211 |
| 2212 | 2213 | 2214 | 2215 |
| 2216 | 2217 | 2218 | 2219 |
| 2220 | 2221 | 2222 | 2223 |

[illegible]

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
84

[illegible]

PM
 AC-FT
 THOUS CU M

258.73
 1185.
 1462.

98.20
 1975.
 2437.

753.48
 2930.
 3683.

SUB-AREA RUNOFF COMPUTATION

DIRECT INFLOW TO RESERVOIR FROM RAINFALL

| ISTAG | ICCP | IICCN | IHADE | JPLI | JPRY | IRAME | ISTAGE | IAUTO |
|-------|------|-------|-------|------|------|-------|--------|-------|
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

HYDROGRAPH DATA

| IMYD | ILMS | IAFPA | SHAP | INQDA | TRPC | RATIO | ISTON | ISAME | LOCAL |
|------|------|-------|------|-------|------|-------|-------|-------|-------|
| 1 | -1 | 0.51 | 0. | 0.51 | 0. | 0. | 0 | 0 | 0 |

PRECIP DATA

| SPR | PFS | PA | R12 | R24 | R48 | R72 | R96 |
|-----|-------|--------|--------|--------|--------|-----|-----|
| 0. | 21.50 | 111.00 | 123.00 | 133.00 | 142.00 | 0. | 0. |

PROPC COMPUTED BY THE PROGRAM IS 0.480

LOSS DATA

| LRPT | STRM | SLKX | PTVL | FRAN | STNG | RIKX | GRYL | CSYL | ALSKX | ATLDP |
|------|------|------|------|------|------|------|------|------|-------|-------|
| 0. | 0. | 0. | 1.00 | 0. | 0. | 1.00 | 0. | 0. | 0. | 0. |

GIVEN UNIT GRAPH, RUNOFF = 1

CSH.

UNIT GRAPH TOTALS 658. CFS OR 1.00 INCHES OVER THE AREA

RECESSION DATA

SIRICE -2.00 ORCSN= -0.10 RTIDE= 1.00

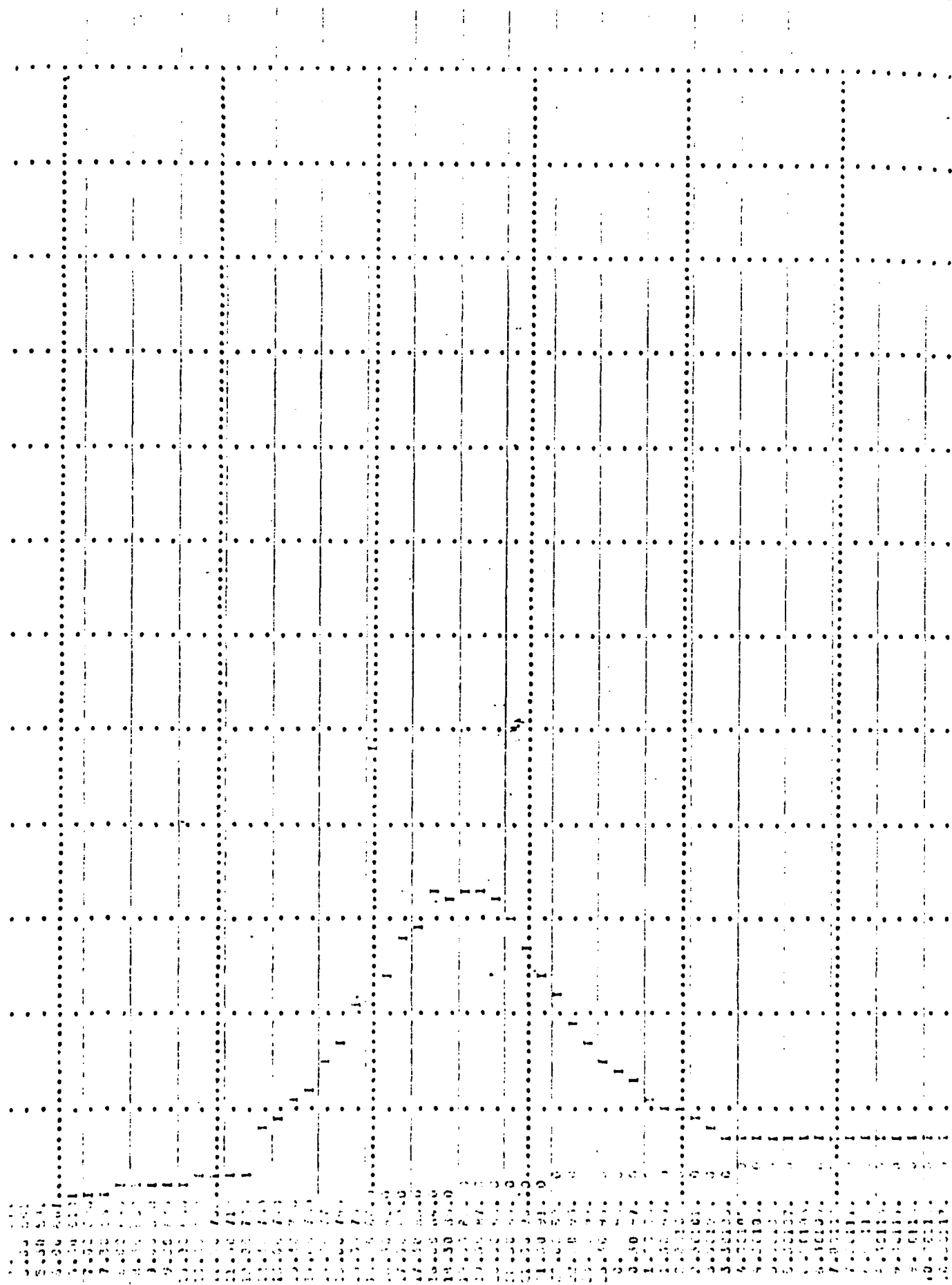
END-OF-PERIOD FLOW

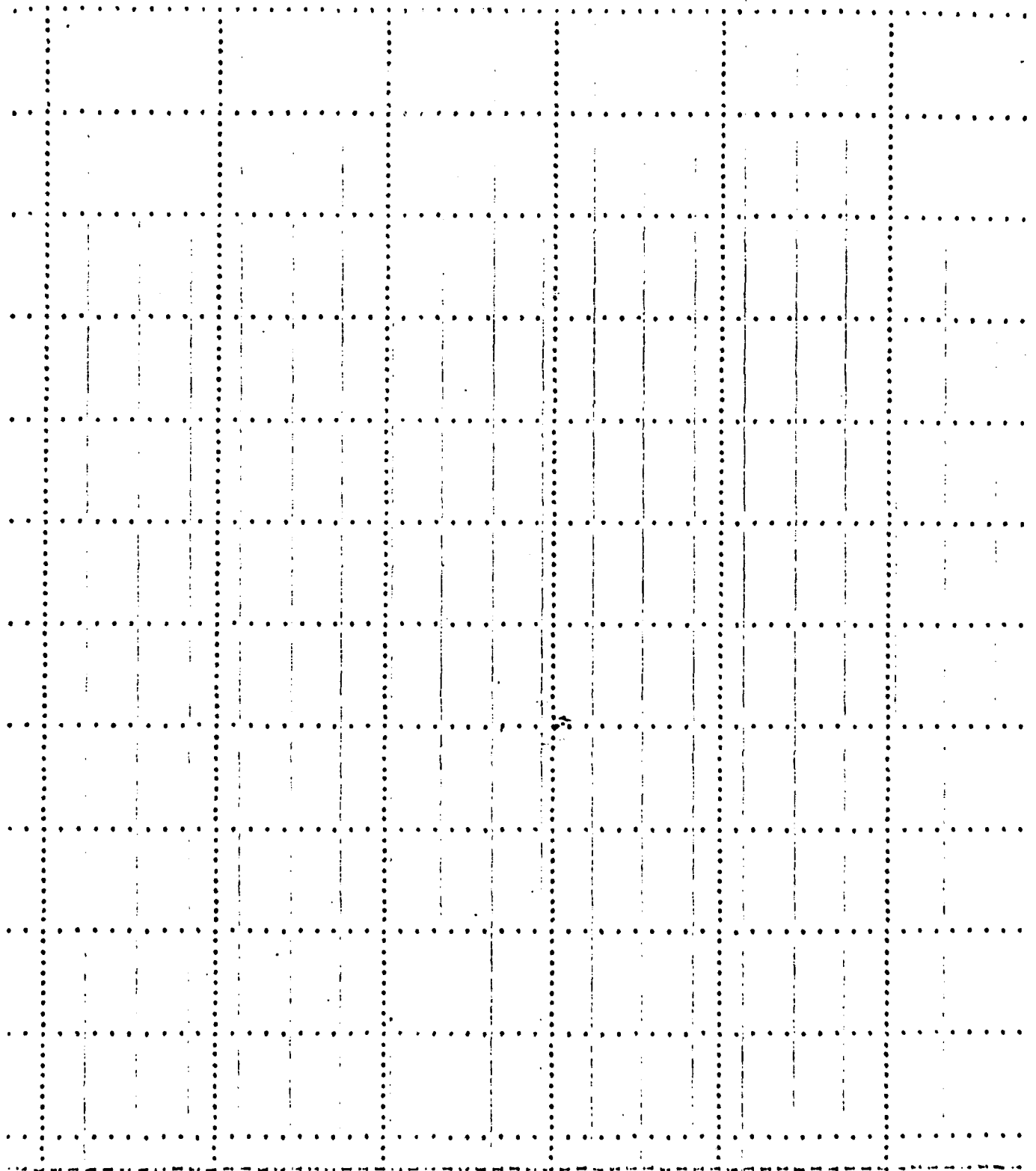
| MCDA | MCDA | PERIOD | MCDA | HR-MN | PERIOD | RAIN | EXCS | LOSS | COMP | EXCS | LOSS | COMP |
|------|-------|--------|------|-------|--------|------|------|------|------|------|------|------|
| 1.01 | 0.50 | 1 | 1.03 | 2.30 | 101 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 1.00 | 2 | 1.03 | 3.00 | 102 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 1.50 | 3 | 1.03 | 3.30 | 103 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 2.00 | 4 | 1.03 | 4.00 | 104 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 2.50 | 5 | 1.03 | 4.30 | 105 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 3.00 | 6 | 1.03 | 5.00 | 106 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 3.50 | 7 | 1.03 | 5.30 | 107 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 4.00 | 8 | 1.03 | 6.00 | 108 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 4.50 | 9 | 1.03 | 6.30 | 109 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 5.00 | 10 | 1.03 | 7.00 | 110 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 5.50 | 11 | 1.03 | 7.30 | 111 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 6.00 | 12 | 1.03 | 8.00 | 112 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 6.50 | 13 | 1.03 | 8.30 | 113 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 7.00 | 14 | 1.03 | 9.00 | 114 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 7.50 | 15 | 1.03 | 9.30 | 115 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 8.00 | 16 | 1.03 | 10.00 | 116 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 8.50 | 17 | 1.03 | 10.30 | 117 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 9.00 | 18 | 1.03 | 11.00 | 118 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 9.50 | 19 | 1.03 | 11.30 | 119 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 10.00 | 20 | 1.03 | 12.00 | 120 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 10.50 | 21 | 1.03 | 12.30 | 121 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 11.00 | 22 | 1.03 | 13.00 | 122 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 11.50 | 23 | 1.03 | 13.30 | 123 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 1.01 | 12.00 | 24 | 1.03 | 14.00 | 124 | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01</ |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|

| | INFLOW(I), | CUTFLOW(I) | AND OBSERVED FLOW(O) |
|------|------------|------------|----------------------|
| 230. | 400. | 500. | 800. |
| | | | 1200. |
| | | | 0. |

[illegible]





1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50
51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

19.01.1961.
19.01.1962.
19.01.1963.
19.01.1964.
19.01.1965.
19.01.1966.
19.01.1967.
19.01.1968.
19.01.1969.
19.01.1970.
19.01.1971.
19.01.1972.
19.01.1973.
19.01.1974.
19.01.1975.
19.01.1976.
19.01.1977.
19.01.1978.
19.01.1979.
19.01.1980.
19.01.1981.
19.01.1982.
19.01.1983.
19.01.1984.
19.01.1985.
19.01.1986.
19.01.1987.
19.01.1988.
19.01.1989.
19.01.1990.
19.01.1991.
19.01.1992.
19.01.1993.
19.01.1994.
19.01.1995.
19.01.1996.
19.01.1997.
19.01.1998.
19.01.1999.
19.01.2000.

STAY IN

END-OF-PERIOD HYDROGRAPH PROFILES

[illegible]

SYNOPSIS

[illegible]

Page-

[illegible]

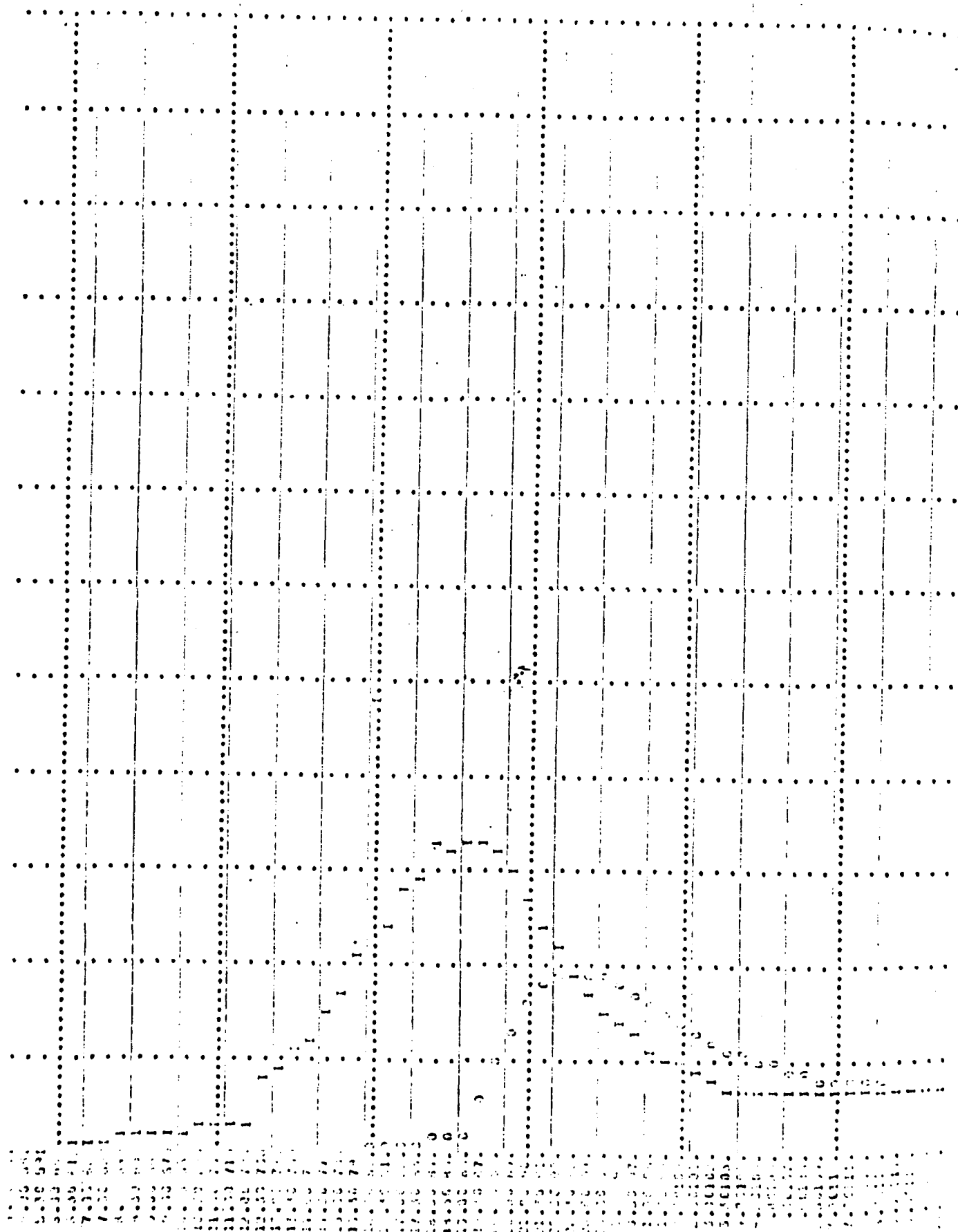
534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2
 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2 534.2

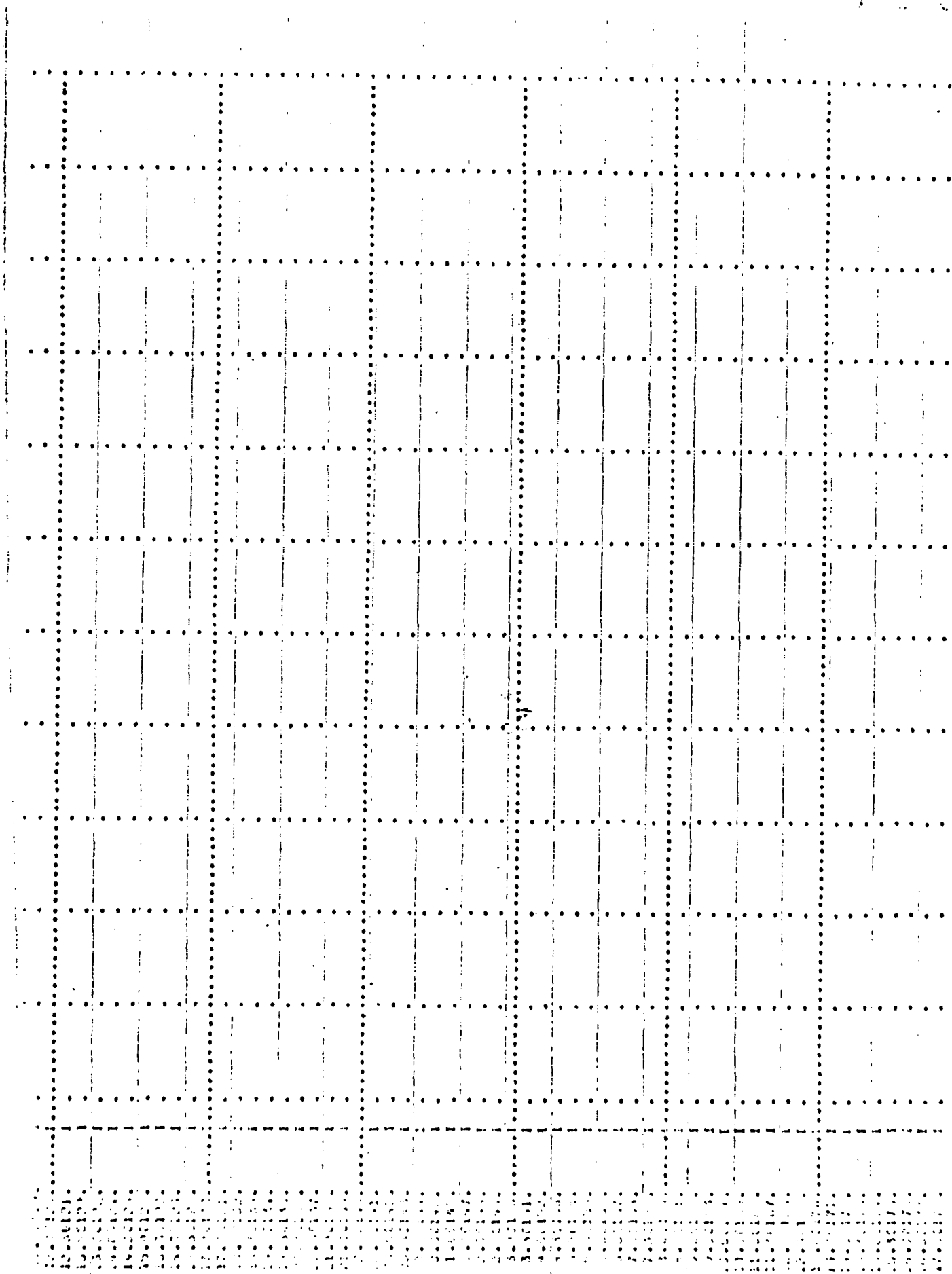
PEAK OUTPUT IS 77% AT 1100 4000 HOURS

| | 11-20 | 6-HOUR | 2-HOUR | 12-HOUR | TOTAL 4000 HOURS |
|------------|-------|--------|--------|---------|------------------|
| FLAR | 71% | 67% | 46% | 25% | 97% |
| CPS | 22 | 19 | 11 | 7 | 107 |
| INCHES | | 2.62 | 6.29 | 12.64 | 12.30 |
| WH | | 55.62 | 159.71 | 309.71 | 309.14 |
| AC-FI | | 356 | 308 | 1543 | 1542 |
| THOUS CU M | | 414 | 992 | 1892 | 1922 |

| INFLUENT, (CUTFLICK) AND OBSERVED FLOW (C) | Q. |
|--|-------|
| 1206. | 1007. |
| 1206. | 1000. |

[illegible]





PLAN-OF-PREICD HYDROGRAPH ORDINATES

Page:

STATION 1

INFLOW (I), OUTFLOW (O) AND OBSERVED FLOW (A)

400. 100. 1200. 1600. 2000. 2400. 2800.

0.

0.

0.

0.

9.

0.

0.

0.

0.

0.

0.

0.

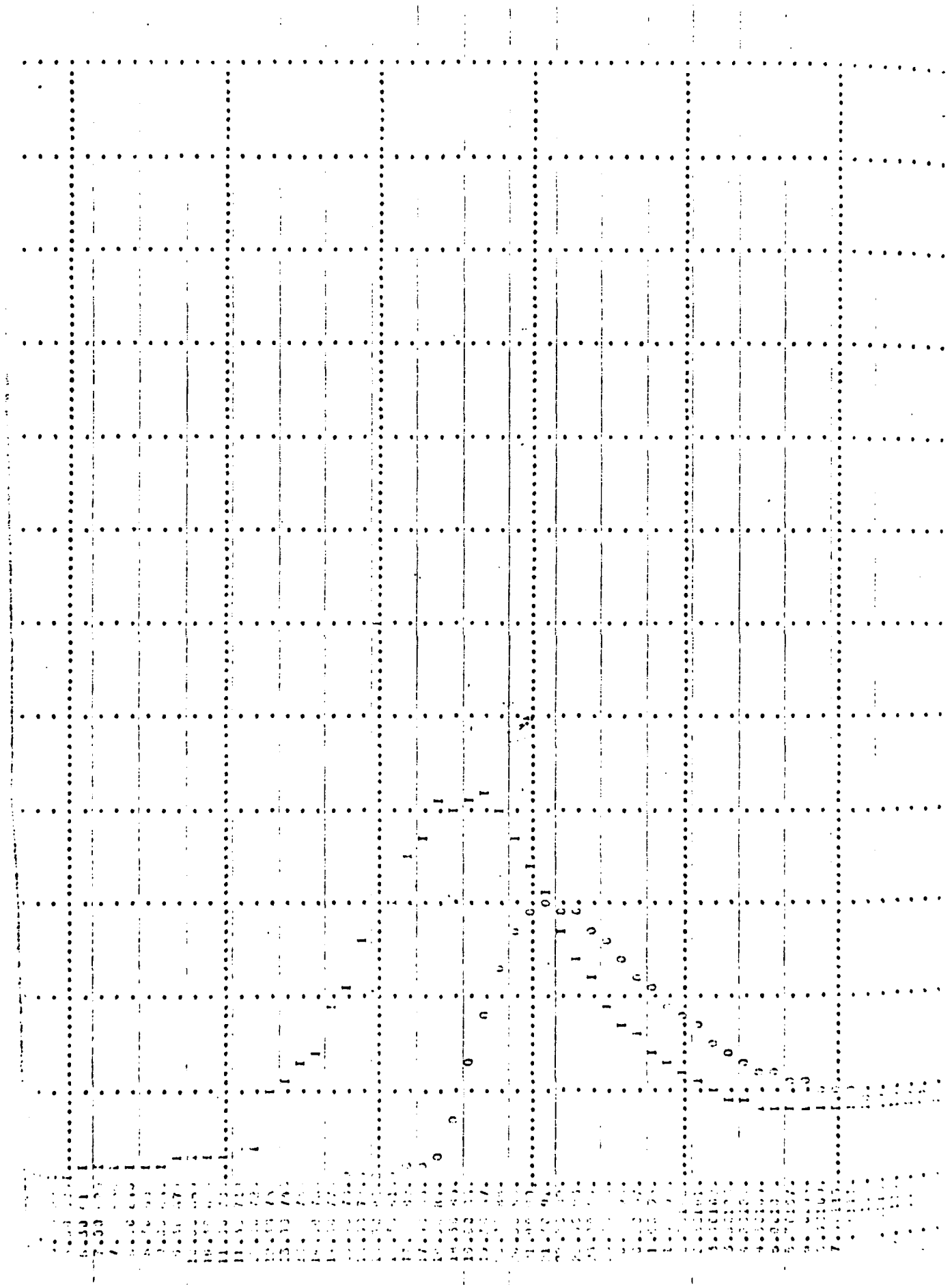
0.

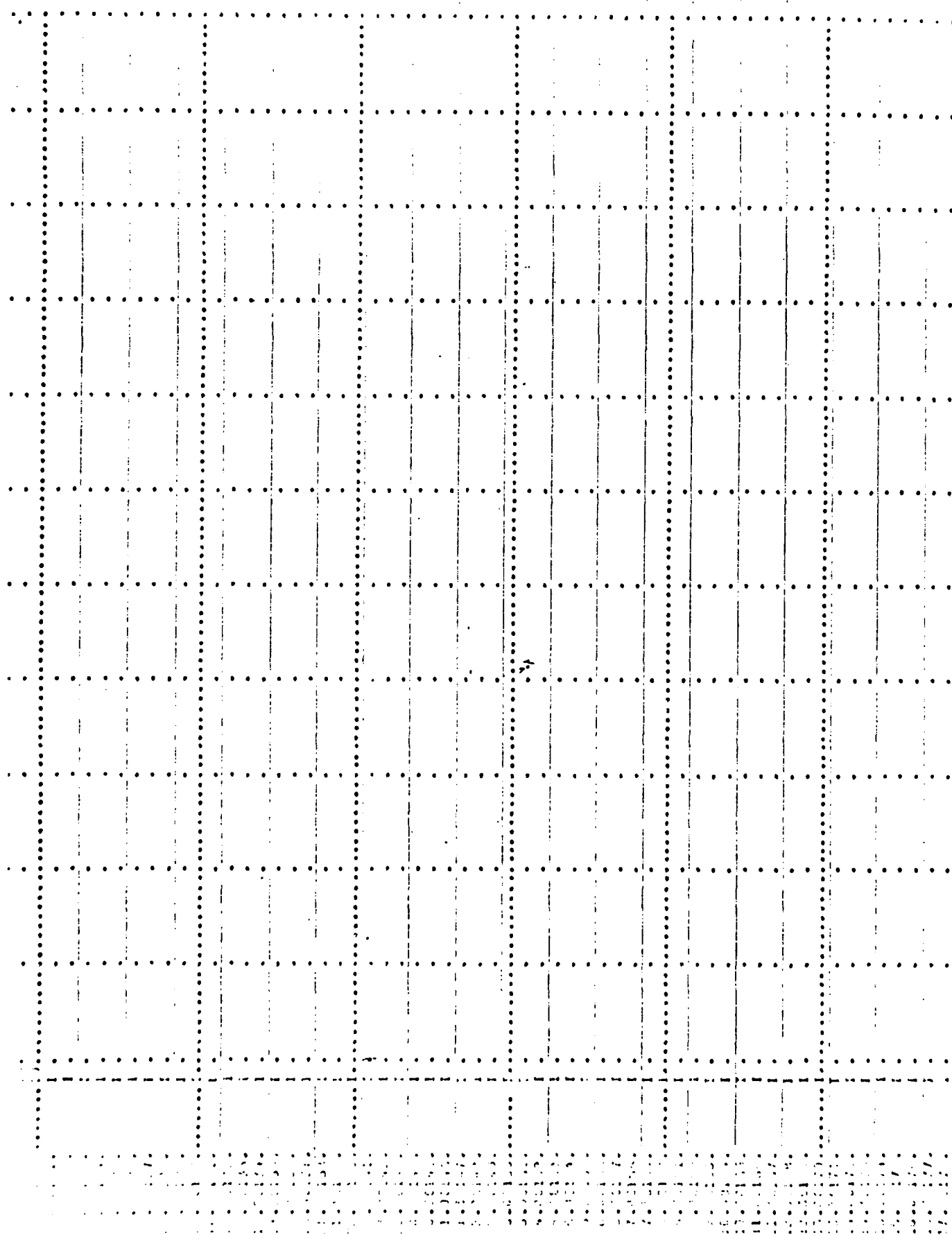
0.

0.

0.

0.





STATION 1, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

[illegible][illegible][illegible]

| | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |
| 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 | 534.3 |

DATA OUTFLOW IS 1576. AT 1147 45.01 HOURS

| CFR | HR | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|-----|--------|---------|---------|--------------|
| 1576. | 45. | 1376. | 121. | 43. | 2273. |
| CMG | | 24. | 21. | 12. | 1774. |
| INCHES | | 5.23 | 11.23 | 20.21 | 23.24 |
| AC-FT | | 132.95 | 240.20 | 513.24 | 513.24 |
| INCHES CUM | | 676. | 1437. | 2589. | 2949. |
| | | 826. | 1772. | 3189. | 3189. |

[illegible]

| | |
|----------|--|
| 14.0000 | |
| 15.0000 | |
| 16.0000 | |
| 17.0000 | |
| 18.0000 | |
| 19.0000 | |
| 20.0000 | |
| 21.0000 | |
| 22.0000 | |
| 23.0000 | |
| 24.0000 | |
| 25.0000 | |
| 26.0000 | |
| 27.0000 | |
| 28.0000 | |
| 29.0000 | |
| 30.0000 | |
| 31.0000 | |
| 32.0000 | |
| 33.0000 | |
| 34.0000 | |
| 35.0000 | |
| 36.0000 | |
| 37.0000 | |
| 38.0000 | |
| 39.0000 | |
| 40.0000 | |
| 41.0000 | |
| 42.0000 | |
| 43.0000 | |
| 44.0000 | |
| 45.0000 | |
| 46.0000 | |
| 47.0000 | |
| 48.0000 | |
| 49.0000 | |
| 50.0000 | |
| 51.0000 | |
| 52.0000 | |
| 53.0000 | |
| 54.0000 | |
| 55.0000 | |
| 56.0000 | |
| 57.0000 | |
| 58.0000 | |
| 59.0000 | |
| 60.0000 | |
| 61.0000 | |
| 62.0000 | |
| 63.0000 | |
| 64.0000 | |
| 65.0000 | |
| 66.0000 | |
| 67.0000 | |
| 68.0000 | |
| 69.0000 | |
| 70.0000 | |
| 71.0000 | |
| 72.0000 | |
| 73.0000 | |
| 74.0000 | |
| 75.0000 | |
| 76.0000 | |
| 77.0000 | |
| 78.0000 | |
| 79.0000 | |
| 80.0000 | |
| 81.0000 | |
| 82.0000 | |
| 83.0000 | |
| 84.0000 | |
| 85.0000 | |
| 86.0000 | |
| 87.0000 | |
| 88.0000 | |
| 89.0000 | |
| 90.0000 | |
| 91.0000 | |
| 92.0000 | |
| 93.0000 | |
| 94.0000 | |
| 95.0000 | |
| 96.0000 | |
| 97.0000 | |
| 98.0000 | |
| 99.0000 | |
| 100.0000 | |

STATION 1, PLAN 1, RATIO 5
END-OF-PERIOD HYDROGRAPH ORDINATES[illegible][illegible][illegible]

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| 5.33 | 5.34 | 5.35 | 5.36 | 5.37 | 5.38 | 5.39 | 5.40 | 5.41 | 5.42 | 5.43 | 5.44 | 5.45 | 5.46 | 5.47 | 5.48 | 5.49 | 5.50 | 5.51 | 5.52 | 5.53 | 5.54 | 5.55 | 5.56 | 5.57 | 5.58 | 5.59 | 5.60 | 5.61 | 5.62 | 5.63 | 5.64 | 5.65 | 5.66 | 5.67 | 5.68 | 5.69 | 5.70 | 5.71 | 5.72 | 5.73 | 5.74 | 5.75 | 5.76 | 5.77 | 5.78 | 5.79 | 5.80 | 5.81 | 5.82 | 5.83 | 5.84 | 5.85 | 5.86 | 5.87 | 5.88 | 5.89 | 5.90 | 5.91 | 5.92 | 5.93 | 5.94 | 5.95 | 5.96 | 5.97 | 5.98 | 5.99 | 6.00 | 6.01 | 6.02 | 6.03 | 6.04 | 6.05 | 6.06 | 6.07 | 6.08 | 6.09 | 6.10 | 6.11 | 6.12 | 6.13 | 6.14 | 6.15 | 6.16 | 6.17 | 6.18 | 6.19 | 6.20 | 6.21 | 6.22 | 6.23 | 6.24 | 6.25 | 6.26 | 6.27 | 6.28 | 6.29 | 6.30 | 6.31 | 6.32 | 6.33 | 6.34 | 6.35 | 6.36 | 6.37 | 6.38 | 6.39 | 6.40 | 6.41 | 6.42 | 6.43 | 6.44 | 6.45 | 6.46 | 6.47 | 6.48 | 6.49 | 6.50 | 6.51 | 6.52 | 6.53 | 6.54 | 6.55 | 6.56 | 6.57 | 6.58 | 6.59 | 6.60 | 6.61 | 6.62 | 6.63 | 6.64 | 6.65 | 6.66 | 6.67 | 6.68 | 6.69 | 6.70 | 6.71 | 6.72 | 6.73 | 6.74 | 6.75 | 6.76 | 6.77 | 6.78 | 6.79 | 6.80 | 6.81 | 6.82 | 6.83 | 6.84 | 6.85 | 6.86 | 6.87 | 6.88 | 6.89 | 6.90 | 6.91 | 6.92 | 6.93 | 6.94 | 6.95 | 6.96 | 6.97 | 6.98 | 6.99 | 7.00 | 7.01 | 7.02 | 7.03 | 7.04 | 7.05 | 7.06 | 7.07 | 7.08 | 7.09 | 7.10 | 7.11 | 7.12 | 7.13 | 7.14 | 7.15 | 7.16 | 7.17 | 7.18 | 7.19 | 7.20 | 7.21 | 7.22 | 7.23 | 7.24 | 7.25 | 7.26 | 7.27 | 7.28 | 7.29 | 7.30 | 7.31 | 7.32 | 7.33 | 7.34 | 7.35 | 7.36 | 7.37 | 7.38 | 7.39 | 7.40 | 7.41 | 7.42 | 7.43 | 7.44 | 7.45 | 7.46 | 7.47 | 7.48 | 7.49 | 7.50 | 7.51 | 7.52 | 7.53 | 7.54 | 7.55 | 7.56 | 7.57 | 7.58 | 7.59 | 7.60 | 7.61 | 7.62 | 7.63 | 7.64 | 7.65 | 7.66 | 7.67 | 7.68 | 7.69 | 7.70 | 7.71 | 7.72 | 7.73 | 7.74 | 7.75 | 7.76 | 7.77 | 7.78 | 7.79 | 7.80 | 7.81 | 7.82 | 7.83 | 7.84 | 7.85 | 7.86 | 7.87 | 7.88 | 7.89 | 7.90 | 7.91 | 7.92 | 7.93 | 7.94 | 7.95 | 7.96 | 7.97 | 7.98 | 7.99 | 8.00 | 8.01 | 8.02 | 8.03 | 8.04 | 8.05 | 8.06 | 8.07 | 8.08 | 8.09 | 8.10 | 8.11 | 8.12 | 8.13 | 8.14 | 8.15 | 8.16 | 8.17 | 8.18 | 8.19 | 8.20 | 8.21 | 8.22 | 8.23 | 8.24 | 8.25 | 8.26 | 8.27 | 8.28 | 8.29 | 8.30 | 8.31 | 8.32 | 8.33 | 8.34 | 8.35 | 8.36 | 8.37 | 8.38 | 8.39 | 8.40 | 8.41 | 8.42 | 8.43 | 8.44 | 8.45 | 8.46 | 8.47 | 8.48 | 8.49 | 8.50 | 8.51 | 8.52 | 8.53 | 8.54 | 8.55 | 8.56 | 8.57 | 8.58 | 8.59 | 8.60 | 8.61 | 8.62 | 8.63 | 8.64 | 8.65 | 8.66 | 8.67 | 8.68 | 8.69 | 8.70 | 8.71 | 8.72 | 8.73 | 8.74 | 8.75 | 8.76 | 8.77 | 8.78 | 8.79 | 8.80 | 8.81 | 8.82 | 8.83 | 8.84 | 8.85 | 8.86 | 8.87 | 8.88 | 8.89 | 8.90 | 8.91 | 8.92 | 8.93 | 8.94 | 8.95 | 8.96 | 8.97 | 8.98 | 8.99 | 9.00 | 9.01 | 9.02 | 9.03 | 9.04 | 9.05 | 9.06 | 9.07 | 9.08 | 9.09 | 9.10 | 9.11 | 9.12 | 9.13 | 9.14 | 9.15 | 9.16 | 9.17 | 9.18 | 9.19 | 9.20 | 9.21 | 9.22 | 9.23 | 9.24 | 9.25 | 9.26 | 9.27 | 9.28 | 9.29 | 9.30 | 9.31 | 9.32 | 9.33 | 9.34 | 9.35 | 9.36 | 9.37 | 9.38 | 9.39 | 9.40 | 9.41 | 9.42 | 9.43 | 9.44 | 9.45 | 9.46 | 9.47 | 9.48 | 9.49 | 9.50 | 9.51 | 9.52 | 9.53 | 9.54 | 9.55 | 9.56 | 9.57 | 9.58 | 9.59 | 9.60 | 9.61 | 9.62 | 9.63 | 9.64 | 9.65 | 9.66 | 9.67 | 9.68 | 9.69 | 9.70 | 9.71 | 9.72 | 9.73 | 9.74 | 9.75 | 9.76 | 9.77 | 9.78 | 9.79 | 9.80 | 9.81 | 9.82 | 9.83 | 9.84 | 9.85 | 9.86 | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|

13.0011
13.0012
13.0013
13.0014
13.0015
13.0016
13.0017
13.0018
13.0019
13.0020
13.0021
13.0022
13.0023
13.0024
13.0025
13.0026
13.0027
13.0028
13.0029
13.0030
13.0031
13.0032
13.0033
13.0034
13.0035
13.0036
13.0037
13.0038
13.0039
13.0040
13.0041
13.0042
13.0043
13.0044
13.0045
13.0046
13.0047
13.0048
13.0049
13.0050
13.0051
13.0052
13.0053
13.0054
13.0055
13.0056
13.0057
13.0058
13.0059
13.0060
13.0061
13.0062
13.0063
13.0064
13.0065
13.0066
13.0067
13.0068
13.0069
13.0070
13.0071
13.0072
13.0073
13.0074
13.0075
13.0076
13.0077
13.0078
13.0079
13.0080
13.0081
13.0082
13.0083
13.0084
13.0085
13.0086
13.0087
13.0088
13.0089
13.0090
13.0091
13.0092
13.0093
13.0094
13.0095
13.0096
13.0097
13.0098
13.0099
13.0100

15.0017.
16.0018.
17.0019.
18.0020.
19.0021.
20.0022.
21.0023.
22.0024.
23.0025.
24.0026.
25.0027.
26.0028.
27.0029.
28.0030.
29.0031.
30.0032.
31.0033.
32.0034.
33.0035.
34.0036.
35.0037.
36.0038.
37.0039.
38.0040.
39.0041.
40.0042.
41.0043.
42.0044.
43.0045.
44.0046.
45.0047.
46.0048.
47.0049.
48.0050.
49.0051.
50.0052.
51.0053.
52.0054.
53.0055.
54.0056.
55.0057.
56.0058.
57.0059.
58.0060.
59.0061.
60.0062.
61.0063.
62.0064.
63.0065.
64.0066.
65.0067.
66.0068.
67.0069.
68.0070.
69.0071.
70.0072.
71.0073.
72.0074.
73.0075.
74.0076.
75.0077.
76.0078.
77.0079.
78.0080.
79.0081.
80.0082.
81.0083.
82.0084.
83.0085.
84.0086.
85.0087.
86.0088.
87.0089.
88.0090.
89.0091.
90.0092.
91.0093.
92.0094.
93.0095.
94.0096.
95.0097.
96.0098.
97.0099.
98.0100.
99.0101.
100.0102.

AD-A109 898

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/6 13/13
NATIONAL DAM SAFETY PROGRAM. GLENMERE LAKE DAM, (INVENTORY NUMB--ETC(U)
SEP 81 6 KOCH DACW51-79-C-0001
NL

UNCLASSIFIED

2.2

2.2



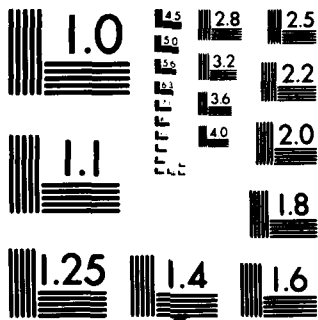
END

DATE

FILED

P-82

DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

11.0011.
12.0012.
13.0013.
14.0014.
15.0015.
16.0016.
17.0017.
18.0018.
19.0019.
20.0020.
21.0021.
22.0022.
23.0023.
24.0024.
25.0025.
26.0026.
27.0027.
28.0028.
29.0029.
30.0030.
31.0031.
32.0032.
33.0033.
34.0034.
35.0035.
36.0036.
37.0037.
38.0038.
39.0039.
40.0040.
41.0041.
42.0042.
43.0043.
44.0044.
45.0045.
46.0046.
47.0047.
48.0048.
49.0049.
50.0050.
51.0051.
52.0052.
53.0053.
54.0054.
55.0055.
56.0056.
57.0057.
58.0058.
59.0059.
60.0060.
61.0061.
62.0062.
63.0063.
64.0064.
65.0065.
66.0066.
67.0067.
68.0068.
69.0069.
70.0070.
71.0071.
72.0072.
73.0073.
74.0074.
75.0075.
76.0076.
77.0077.
78.0078.
79.0079.
80.0080.
81.0081.
82.0082.
83.0083.
84.0084.
85.0085.
86.0086.
87.0087.
88.0088.
89.0089.
90.0090.
91.0091.
92.0092.
93.0093.
94.0094.
95.0095.
96.0096.
97.0097.
98.0098.
99.0099.
100.0100.

PEAK FLOW AND STORAGE (EAD OF PERIOD) SUMMARY FORMULTEPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE FEET (SQUARE KILOMETERS)

| OPERATION | STATION | AREA | PLAN | RATIOS APPLIED TO FLOWS | | | | | |
|---------------|-------------|------|------|-------------------------|---------|---------|---------|----------|----------|
| | | | | RATIO 1 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 | RATIO 6 |
| HYDROGRAPH AT | 1 | 1.83 | 1 | 0.50 | 0.40 | 0.50 | 0.50 | 0.40 | 1.00 |
| | (7455.72) | | | 154. | 1145. | 1482. | 1779. | 2571. | 2554. |
| HYDROGRAPH AT | 1 | 3.51 | 1 | 0.700 | 1452. | 1815. | 2177. | 2331. | 3529. |
| | (7455.72) | | | 20.5500 | 41.1100 | 51.3000 | 61.6600 | 62.3100 | 102.7500 |
| STATION 2 | 1 | 2.40 | 1 | 0.90 | 1425. | 2406. | 2447. | 3833. | 4812. |
| | (7455.72) | | | 27.2000 | 54.5000 | 68.1200 | 81.7500 | 105.3300 | 135.2500 |
| STATION 3 | 1 | 2.40 | 1 | 1.30 | 775. | 1182. | 1576. | 2314. | 3029. |
| | (7455.72) | | | 3.7000 | 21.9000 | 30.4000 | 44.6200 | 65.5000 | 85.7300 |

ELEVATION
 STORAGE
 CUTOFF
 INITIAL VALUE
 SPILLWAY CREST
 TOP OF DAM

531.35
 2430.
 0.
 532.35
 2440.
 0.
 534.00
 5572.
 78.

| WATER OF | PAVING RESURFACING | MAXIMUM DEPTH OVER DAM | MAXIMUM STORAGE ACROSS | MAXIMUM CUTOFF CFS | DURATION OVER TOP HOURS | TIME OF MAX OUTFLOW HOURS | TIME OF FAILURE HOURS |
|-------------|-----------------------|------------------------------|------------------------------|--------------------------|-------------------------------|---------------------------------|-----------------------------|
| 0.00 | 534.00 | 0.00 | 3403. | 832. | 40.00 | 90.50 | 0. |
| 0.25 | 534.15 | 0.00 | 3504. | 775. | 57.00 | 90.50 | 0. |
| 0.50 | 534.32 | 0.00 | 3671. | 1182. | 53.00 | 90.50 | 0. |
| 0.75 | 534.48 | 0.42 | 3875. | 1576. | 53.00 | 45.00 | 0. |
| 1.00 | 534.65 | 1.00 | 3774. | 2319. | 63.00 | 44.50 | 0. |
| 1.25 | 534.82 | 1.24 | 3856. | 3039. | 61.00 | 44.50 | 0. |

APPENDIX D

REFERENCES

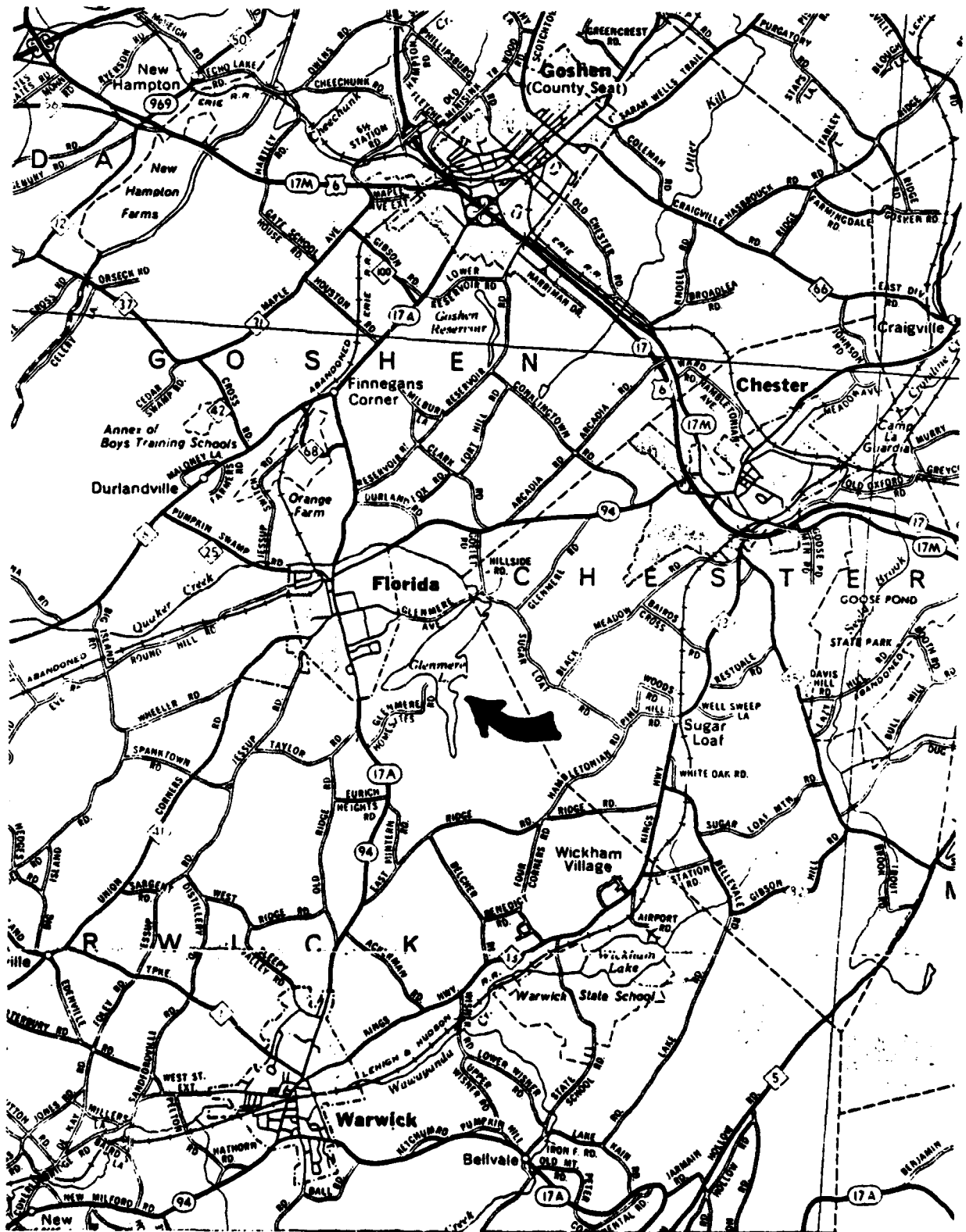
APPENDIX D

REFERENCES

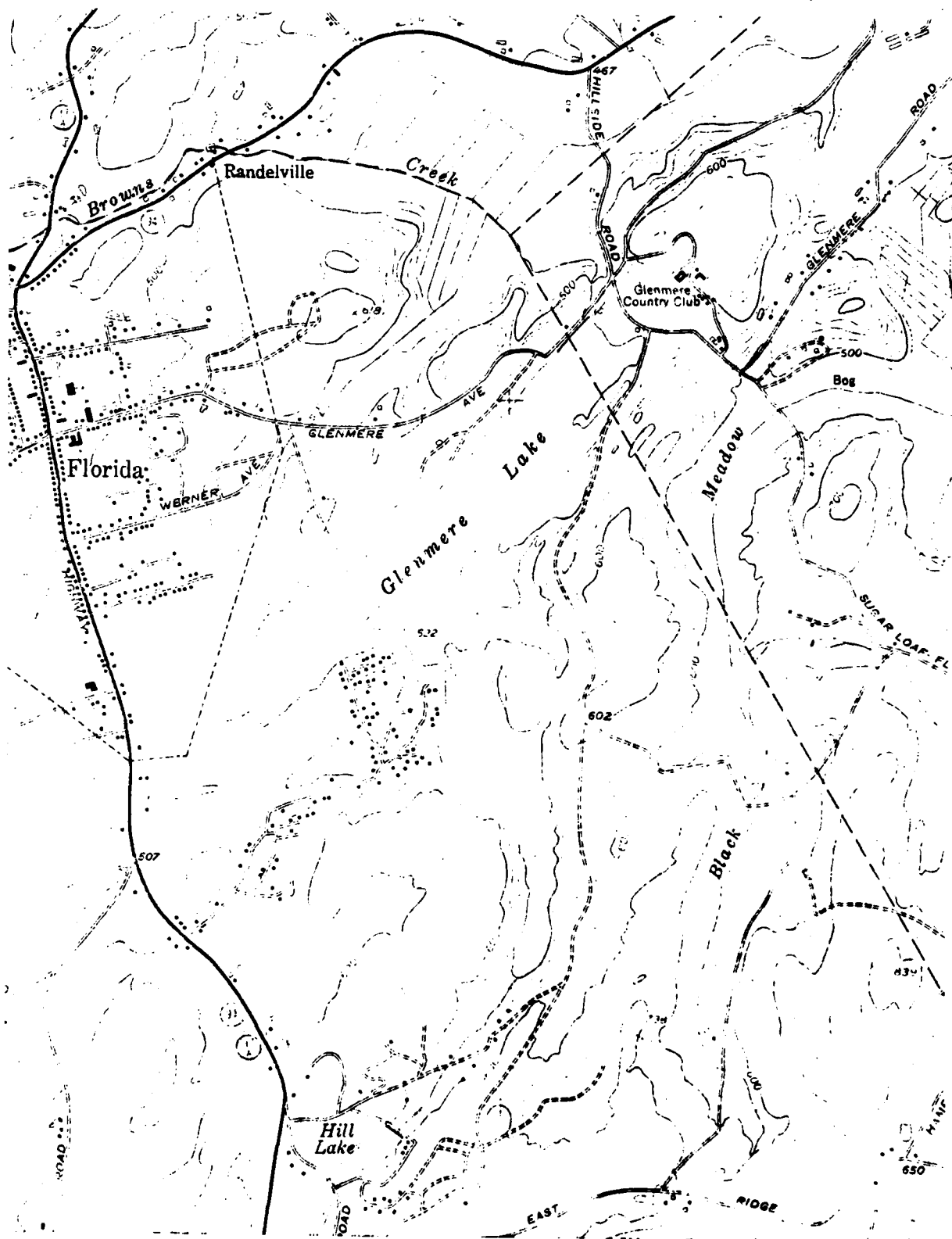
- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours; April 1956.
- 3) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).
- 4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 5) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.
- 6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

DRAWINGS



VICINITY MAP



TOPOGRAPHIC MAP